

Evaluating impacts of recent Arctic sea-ice loss on the northern hemisphere winter climate change

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Wide disagreement among individual modeling studies has contributed to a debate on the role of recent sea ice loss in the Arctic amplification of global warming and the Siberian wintertime cooling trend. We perform coordinated experiments with six atmospheric general circulation models (AGCMs) forced by the observed and climatological daily sea-ice concentration and sea surface temperature (SST). The results indicate that the impact of the recent sea-ice decline is rather limited to the high-latitude lower troposphere in winter. The near-surface warming trends over Greenland and northern Canada are still robustly reproduced throughout the different models even when the prescribed SST in low latitudes are fixed to its climatology. The fact suggests that a remote influence from the Tropical Pacific as pointed out previously may not be critical for the trends. On the other hand, the observed wintertime Siberian temperature cooling and corresponding circulation trends are reproduced in a small number of ensemble members but not by the multi-model ensemble mean, suggesting that atmospheric internal dynamics could have played a major role in the observed trends. Representation of the simulated trends in the stratosphere and its relation to the tropospheric trends will also be discussed. This is a joint study with GREENICE team: (<https://greenice.w.uib.no/>).

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